

- 1MHz TO 520MHz FREQUENCY RANGE WITH 1kHz RESOLUTION
- OVERALL FREQUENCY ACCURACY OF 0.001%
- PHASE-LOCK STABILITY
- BUILT-IN FREQUENCY PROGRAMMABILITY
- CALIBRATED OUTPUT FROM +13dBm to -137dBm
- INTERNAL AND EXTERNAL AM/FM CAPABILITY

The Model 3000 Signal Generator is a ruggedized, completely solid-state instrument covering the VHF frequency range of 1 to 520MHz. Exceptional performance and ease of operation are key features of this low cost unit.

The accuracy, stability, dynamic range and AM/FM capability can be found only in instruments 2 to 3 times the selling price of the Model 3000.

The design of the instrument is based on a crystal-controlled oscillator that serves as a stable frequency source for the derivation of various reference frequencies. These reference frequencies are heterodyned with phase-locked voltage-controlled oscillators that enable the Model 3000 to provide high-stability signals to an accuracy of 0.001% over its specified 1MHz to 520MHz range.

The frequency of the unit is set via 6 front-panel lever/indicator switches resulting in a resolution of 1kHz. In addition, remote frequency programmability is standard. This feature makes the Model 3000 Signal Generator ideally suited for both semi and fully automatic test applications. Commonly available switches or custom designed test fixtures used in conjunction with the Model 3000 can result in tremendous production test savings and at the same time minimize the typical human errors associated with repetitive type measurements.

The Model 3000 also features both internal and external amplitude and frequency modulation capabilities. Internal AM and FM modulation frequencies of 400Hz and 1kHz are available. In the FM mode of operation, peak deviations up to 500kHz are attainable. In the AM mode of operation amplitude modulation to 90% is attainable.

In the CW and AM modes of operation the overall accuracy of the unit is 0.001% including short and long term drift, incidental FM and variations due to line and temperature changes. In the FM mode, the frequency is accurate to  $0.001\% \pm 10\text{kHz}$  up to 5 kHz peak deviation and  $0.001\% \pm 45\text{kHz}$  up to 500 kHz peak deviation.

The output power is monitored on a front-panel meter calibrated in both dBm and volts RMS. A fifteen position 10dB step attenuator used in conjunction with a 11dB vernier control provides the user with a range of +13 dBm to -137dBm. The calibrated output of the Model 3000 is leveled to within  $\pm 0.75\text{ dB}$  across the complete frequency range of the instrument.

With the modulation mode switch in either of the FM positions and the modulation frequency switch in the vernier position, the front-panel slide control potentiometer can be used to continuously vary the output frequency over either a 5kHz or 500kHz range. With the modulation mode switch in the AM position and the modulation frequency switch in the vernier position the output amplitude can be varied via the same front-panel slide control. This not only provides a reference attenuator for variation of signal level around a specific point of interest but also enables the user to obtain greater than 20 milliwatts of power over portions of the band.



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# Specifications

# Model 3000

## FREQUENCY

### Range:

1MHz to 520MHz selectable in 1kHz steps

### Readout:

6 Digit lever/indicator switch

### Resolution:

1kHz

### Fine Tuning:

Vernier adjustment of up to 500kHz

### Accuracy:

CW and AM mode  $\pm 0.001\%$   
FMx1 mode  $\pm (0.001\% + 10\text{kHz})$   
FMx100 mode  $\pm (0.001\% + 45\text{kHz})$

### Stability:

CW and AM mode  $< 0.2 \text{ ppm/hr.}$   
FM modes 500Hz per 10 min.

## RF OUTPUT

### Power Level:

+13dBm to -137dBm (1V to .03uV)

### Attenuator Range:

Continuously adjustable from +13 to -137dBm, in 10dB steps and a 11dB vernier. Output level is indicated on a front panel meter calibrated in volts and dBm.

### Total Level Accuracy:

+13 to -7dBm  $\pm 1.25\text{dB}$   
-7 to -77dBm  $\pm 1.95\text{dB}$   
-77 to -137dBm  $\pm 2.75\text{dB}$

### Total level error consists of the following:

Flatness (+13 to -7dB)  $\pm 0.75\text{dB}$   
Output meter  $\pm 0.5\text{dB}$ ,  
Step attenuator  $\pm 0.5\text{dB}$  to 70dB  
( $\pm 0.2\text{dB}$  calibration error)  
 $\pm 1.0\text{dB}$  to 130dB  
( $\pm 0.5\text{dB}$  calibration error)

### Impedance:

50 Ohm (SWR  $< 1.2$ )

## SPECTRAL PURITY

### Harmonic Output:

$> 30\text{dB}$  below fundamental from 10 to 520MHz  
 $> 20\text{dB}$  below fundamental from 1 to 10 MHz

### Sub-Harmonics:

None detectable

### Non-Harmonics:

$> 70\text{dB}$  below fundamental from 1 to 200MHz  
 $> 60\text{dB}$  below fundamental from 1 to 350MHz  
 $> 35\text{dB}$  below fundamental from 1 to 520MHz

### Residual AM:

$> 55\text{dB}$  below carrier in a 50Hz to 15kHz post detection noise bandwidth

### Residual FM:

Typically 200Hz (50 Hz to 15 kHz bandwidth)

## AMPLITUDE MODULATION

### Frequency

Internal: 400 Hz and 1kHz  $\pm 10\%$   
External: DC to 20kHz (10 volts p-p into 600 Ohm is required to provide calibrated % modulation control)

### Range:

0 to 90%

### Distortion:

3% to 70% AM (5% to 90% AM) at frequencies of 1kHz

### Modulation Control:

Calibrated from 0 to 100%

### Accuracy:

$\pm 5\%$  F.S.

## FREQUENCY MODULATION

### Frequency:

Internal: 400Hz and 1kHz  $\pm 10\%$   
External: DC to 25kHz (10 volts p-p into 600 Ohm is required to provide calibrated deviation control.

### Deviation Peak:

Two bands, 0 to 5kHz and 0 to 500kHz

### Deviation Control:

Calibrated from 0 to 5kHz, X1 and X100

### Accuracy:

$\pm 250 \text{ Hz}$  on X1 range  
 $\pm 35\text{kHz}$  on X100 range

## PROGRAMMABILITY

### Frequency:

Frequency is programmable via rear panel input connector set by standard 8-4-2-1 BCD contact closures.

## GENERAL

### Output Connector:

Type N

### Power:

115/230 V  $\pm 10\%$ , 50/60Hz

### RFI:

Meets MIL-I-6181 D

### Dimensions:

12 in. wide, 5 $\frac{1}{4}$  in. high, 13 $\frac{3}{4}$  in. deep

### Weight:

25 lb. net, 30 lb. shipping

## ORDER INFORMATION

Prices — F.O.B. Beech Grove, Indiana

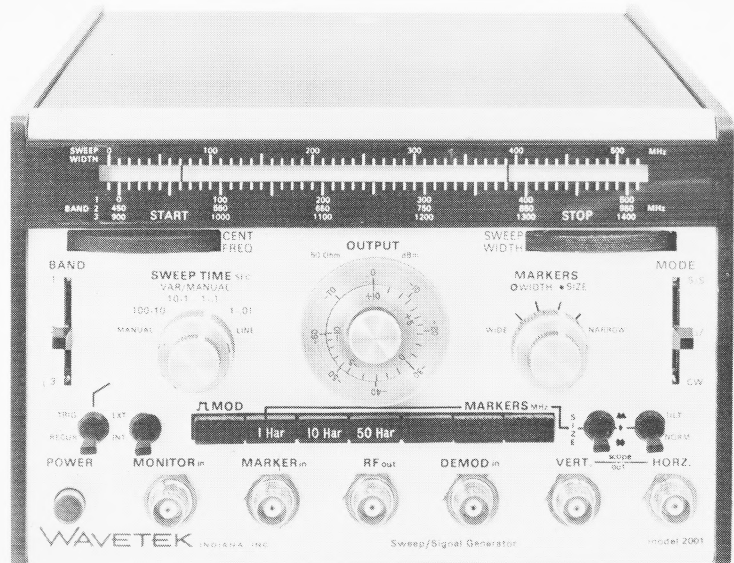
Model 3000 ..... \$1,975.00

# Model 2001 Sweep/Signal Generator

- 1 MHz to 1400 MHz in one unit
- Start/stop,  $\Delta f$  and CW operating modes
- Ideal for both broad and narrow sweep applications
- Crystal-controlled markers accurate to 0.005%
- Calibrated RF output system

The Model 2001 is a three-band sweep generator of modular construction with exceptional versatility for use in both laboratory and production test applications. The easy-to-use controls permit quick and precise setting of all functions. In the start/stop mode the frequency may be swept either up or down. In the  $\Delta f$  mode the sweep width may be set anywhere between 200 kHz and 500 MHz. End points or sweep width are indicated on a tape read-out calibrated in 10 MHz intervals. Output level is continuously adjustable from +10 to -80 dbm, 70 db in 10 db steps plus a 20 db pin diode attenuator, calibrated in 1 db increments. Excellent linearity and  $\pm 0.5$  db flatness over the 1 to 1400 MHz range enhances the unit's applications. Up to six crystal controlled birdy markers, each having its own front panel on/off switch, can be provided in each instrument. Marker width and amplitude can be varied to suit specific test requirements. They also may be tilted for easy viewing when displayed on steep skirts of response curves.

\$1695



# Model 2000 Sweep/Signal Generator



- Most economical sweeper available up to 1.4 GHz
- Can be remotely programmed
- PIN diode leveling
- Manual, triggered or recurring sweep modes

The Model 2000 is an economical version of the top-of-the-line 2001 Sweep Generator. The only major difference is that the Model 2000 has just two modes of operation;  $\Delta f$  sweep and CW. A three-position sweep width switch results in excellent narrow band resolution. The unit may be locked to the AC line or swept at rates of from 50 sweeps per second to 1 sweep every 100 seconds. As in the Model 2001, provisions are made for a combination of up to six plug-in marker modules. The markers may be at single discrete frequencies or at harmonic intervals. Other options include pen lift and built-in 1 KHz square wave modulation. The standard unit has a well-matched 50 ohm output system. Units with matched 75 ohm output systems and calibrated from +57 DbmV to -33 DbmV are also available at no increase in cost.

\$1375

**WAVETEK®**

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# Series 1000 Sweep/Signal Generators

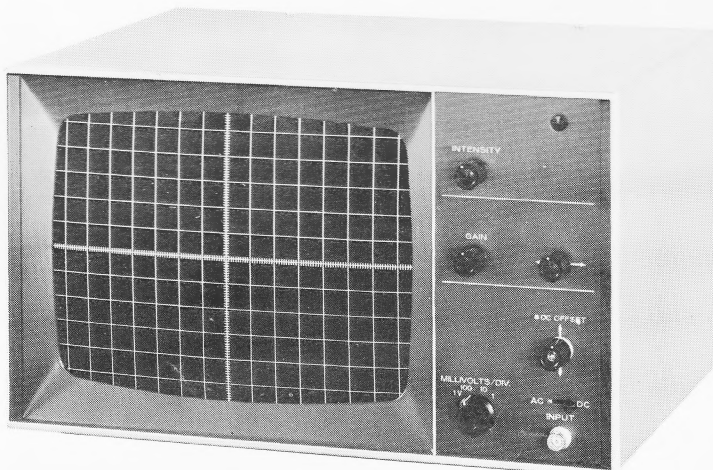
- Wide band operation
- Excellent display linearity
- PIN diode leveling
- Available with either 50 ohm or 75 ohm calibrated outputs

The 1000 Series Sweep Generators are wide band general purpose instruments offering selected frequency bands and multi-function capabilities. The series includes models covering the frequency ranges 0.5 to 300 MHz (1001), 1.0 to 500 MHz (1002), 500 to 1000 MHz (1004), and 700 to 1400 MHz (1005). Each model features solid-state design, PIN diode leveling and attenuation and provision for external AM and FM. All are usable as signal generators with excellent dial accuracy and resolution. Up to 8 plug-in marker modules, each with an individual on-off switch, may be added to the marker system. Harmonic markers are available at 0.1, 1, 10, or 50 MHz. Single discrete frequency markers are available anywhere in the range. Provision for an external marker is also provided. All models are available with either 50 ohm or 75 ohm output systems to insure a proper match into the impedance of the unit under test. \$995/\$1095



## Model 1901 Display Oscilloscope

- 1 MV/DIV vertical sensitivity
- Large screen display
- Solid-state design
- Ideal for laboratory or production test applications



The Model 1901 is a natural companion instrument for the complete Wavetek Sweep/Signal Generator line. The large 12-inch screen can be easily read to a high degree of accuracy and resolution. Operation of the unit is simplified by use of a minimum number of controls on a human engineered front panel. High vertical sensitivity permits display of low-level signals. In addition to a four position vertical sensitivity switch, a continuous vernier control is provided for complete coverage between steps.

\$475

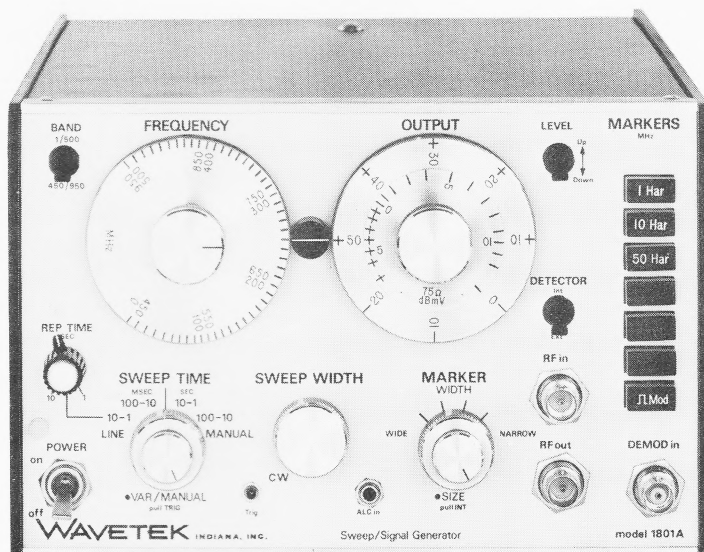
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# Model 1801A CATV Sweep Generator

- Covers complete CATV frequency range
- Ideal for simultaneous sweeping of operating systems
- 75 ohm calibrated output from +57 dBmV to -33 dBmV
- Crystal-controlled marker system for internal modulation of the RF Signal
- Wide use in production testing
- Built-in detector



The Model 1801A CATV Sweep/Signal Generator is ideally suited for installing, testing and maintaining cable television (CATV) systems, in addition to fulfilling all of the manufacturer's test requirements. The 1801A operates over the frequency range of 1 to 500 MHz and offers an optional additional 450-950 MHz band if the user contemplates operation at these higher frequencies in the future. The instrument incorporates many of the features and specifications of other Wavetek General Purpose Sweep/Signal Generators, including crystal-controlled birdy markers with variable width and amplitude controls, output flatness of  $\pm 0.25$  db and spurious signals at least 30 db down. In addition, the unit incorporates a precision electronic switch to vary the RF output up to  $\pm 0.5$  db for discrete flatness and comparison measurements. A built-in 1 to 5 millisecond sweep, triggered from 1 to 10 second recurring rates, provides a method for evaluating an operating CATV system with minimum subscriber interference.

\$1245 (1-500 MHz)

\$1445 (both bands)

# Model 1312 Sweep/Marker Generator

- Generates fixed frequency bands in the 4 MHz to 250 MHz range
- Ideal for production-line applications
- 1 Volt rms output
- Full or partial sweeping of selected bands

The Model 1312 Sweep-Marker Generator is a versatile, solid-state instrument that generates fixed frequency bands in the 4 MHz to 250 MHz range. The unit also provides crystal-controlled pulse type markers whose frequencies can be easily changed by substitution of plug-in crystals. Standard center frequencies are available at 4.5 MHz, 5.5 MHz, 10.7 MHz, 11.5 MHz and 98 MHz with corresponding frequency band widths of 4 to 5 MHz, 5 to 6 MHz, 9.7 to 11.7 MHz, 10.5 to 12.5 MHz, and 86 to 110 MHz. Other bands to cover military, fire, highway, public, citizen radio, common carrier, flight test telemetry, maritime, and scientific bands in the 4 MHz to 250 MHz range are available on special order. The center frequency and sweep width are controlled by front panel mounted potentiometers that permit full or partial sweeping of the band widths specified. Front panel switches permit six fixed steps of attenuation and an electronic variable attenuator can be used to reduce the signal another 30 db for an overall attenuation capability of 109 db. Up to five crystal-controlled pulse-type markers can be utilized in each unit.

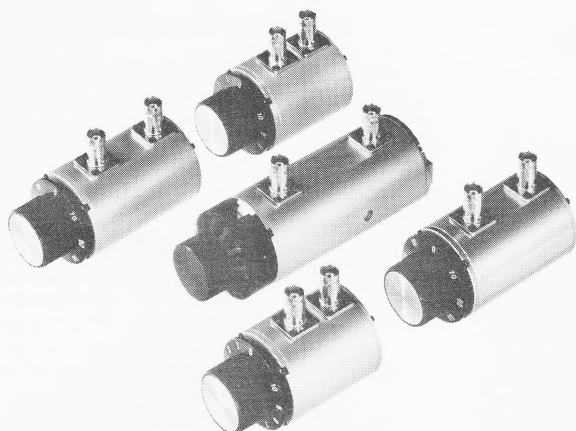
\$695



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# Series 5000 & 7500 50 ohm and 75 ohm Attenuators



- Broadband operation
- Low VSWR
- High repeatable accuracy
- Ideal for laboratory and OEM use

The Models 5001, 5010, and 5070 attenuators are 50 ohm miniature turret-type step attenuators operating over the DC to 2 GHz frequency range with VSWR's of less than 1.2:1 at 1 GHz and 1.5:1 at 2 GHz. The 5001 provides 1 to 2 db of attenuation in 0.1 db steps. The 5010 provides 10 db of attenuation in 1 db steps and the 5070 provides 70 db of attenuation in 10 db steps. The Model 5080 is a dual concentric type attenuator with a total of 80 db attenuation variable in 1 db steps with characteristics equivalent to the other units in the series.

The Models 7501, 7510, and 7570 attenuators are similar to the 5000 series except for their 75 ohm impedance and an upper frequency limit of 1 GHz. The return loss of all three units is 21 db minimum up to 1000 MHz making them ideal for use in CATV test and alignment systems. The Model 7580 with a total of 80 db attenuation in 1 db steps is also available as a standard unit.

All Series 5000 and 7500 attenuators are direct reading and suited for panel mounting.

Model 5001, 5010, 5070 \$ 80

Model 7501, 7510, 7570 \$ 90

Model 7580, 5080 \$195/\$185

## Series 150, 170 RF Detectors

- Flat response
- Low VSWR
- Reverse polarity capability
- Ideal for laboratory and OEM applications

The Series 150, and 170 detectors were designed for applications requiring low VSWR and flat frequency response across broad operating ranges. The Models D151 and D152 are 50 ohm units with typical VSWR's of 1.2 at 1 GHz. Both units have BNC male input connectors and BNC female output connectors. The D151 has a 1 GHz upper limit whereas the D152 can be operated up to 2 GHz.

The Model D171 is a 75 ohm detector that operates over the frequency range of 200 KHz to 1000 MHz with a response of  $\pm 0.3$  db and a return loss of greater than 23 db. All of the above 50 and 75 ohm units are also available with BNC female connectors on both input and output ports for ease in mating with cable assemblies.

The Model M151 is a three port, high impedance detector designed to obtain amplitude vs frequency response of an RF circuit with minimum circuit disturbance. It may also be used as an external monitor to level the sweep signal at the input junction of any device under test.

Model D151, D171 \$55

Model D152 \$75

Model M151 \$75



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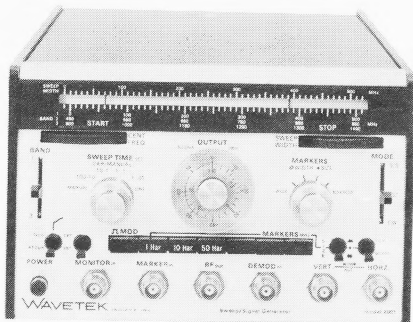
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## MODEL 2001 SWEEP SIGNAL GENERATOR



- 1 MHz to 1400 MHz in one unit.
- Ideal for both broad and narrow-band applications.
- Calibrated RF output system.
- Manual, triggered, or recurring sweep mode.
- Excellent flatness and display linearity.

### SPECIFICATIONS

Frequency Range: 1 to 1400 MHz.

RF Output:

Continuously adjustable from +10 dBm to -80 dBm.

Display Linearity: 2%.

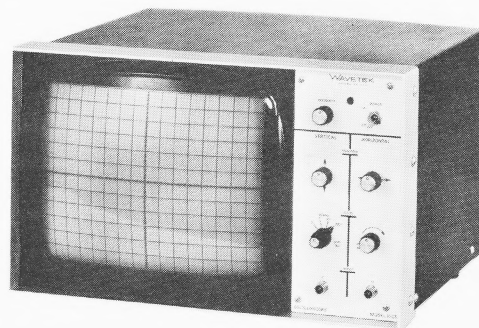
Output Flatness:  $\pm 0.5$  dB.

Spurious Signals: -30 dB.

Marker Accuracy: 0.005%.

Price: \$1,850.

## MODEL 1901A DISPLAY OSCILLOSCOPE



- Large 12-inch diagonal CRT.
- 1 mV/division sensitivity.
- Bright, well-focused trace.
- Ideal for production test applications.

### SPECIFICATIONS

CRT Display: 12-inch diagonal.

Deflection: Magnetic.

Acceleration Voltage: 9 kV nominal.

Phosphor:

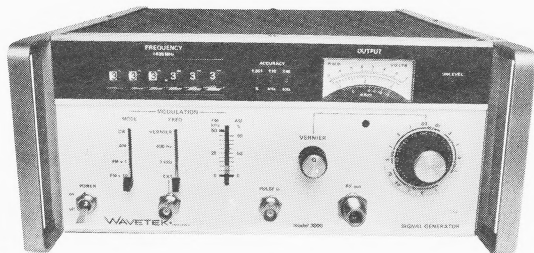
P1 (medium persistence); P4 and P7 available as options.

Vertical Bandwidth: DC to 15 kHz.

Horizontal Linearity: 3%.

Price: \$475.

## MODEL 3000 SIGNAL GENERATOR



- 1 MHz to 520 MHz with 1 kHz resolution.
- Over-all frequency accuracy of 0.001%.
- Phase-lock stability.
- Built-in frequency programmability.
- Calibrated output from +13 dBm to -137 dBm.
- Internal and external AM/FM capability.

### SPECIFICATIONS

Frequency Range: 1 MHz to 520 MHz.

Resolution: 1 kHz.

Accuracy: CW and AM modes: 0.001%.

Stability: CW and AM modes: 0.2 PPM/hour.

Power Level: +13 dBm to -137 dBm.

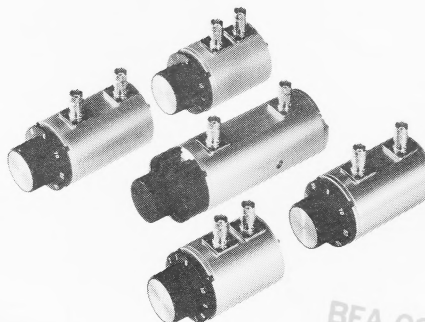
Residual FM: Typically 200 Hz.

AM/FM Modulation: Internal—400 Hz and 1 kHz.

Programmability: Frequency is digitally programmable.

Price: \$1,975.

## SERIES 5000 ATTENUATORS



- Broadband operation.
- Low VSWR.
- High repeatable accuracy.
- Ideal for systems manufacturers, plant and field use.

### SPECIFICATIONS

Frequency Range: DC to 2,000 MHz.

Impedance: 50 ohms (75-ohm units also available).

Attenuation:

Model 5001: 0-1 in 0.1 dB steps.

Model 5010: 0-10 in 1 dB steps.

Model 5070: 0-70 in 10 dB steps.

Model 5080: 0-80 in 1 dB steps.

Prices: Models 5001, 5010, and 5070: \$90.

Model 5080: \$190.

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